

Alzheimer's disease and primary open-angle glaucoma associated with vascular health in patients of African descent

Katherine Hutchins,¹ Alon Harris,¹ Joseph Thomas,¹ Sameerah Alkhairy,¹ Alice Chandra
Verticchio Vercellin,^{1,2,3} Aaditya Shah,¹ Brent Siesky,¹

¹ Department of Ophthalmology, Eugene and Marilyn Glick Eye Institute, Indiana University
School of Medicine, Indianapolis, IN, USA;

² University Eye Clinic, IRCCS, Policlinico San Matteo, Pavia, Italy;

³ Glaucoma Unit, Istituto di Ricovero e Cura e Carattere Scientifico, Fondazione G.B.Bietti,
Rome, Italy

Editor,

Patients of African descent are disproportionately affected by both primary open-angle glaucoma (POAG) (Racette et al. 2003) and Alzheimer's disease (AD) (Steenland et al. 2016) compared to their European counterparts. Importantly, both diseases represent chronic, age-related and multifactorial neurodegenerative disorders affecting ocular and brain tissue of similar embryological origin. As vascular risk factors have been implicated in the pathophysiology of both POAG and AD, it is possible that differences in vascular pathology may account for a portion of the shared increased risk for both POAG and AD in patients of African descent.

Specifically, patients with AD were reported to have a fivefold increase in glaucoma compared to matched controls, despite lower mean intraocular pressure, suggesting a nonpressure influence

This is the author's manuscript of the article published in final edited form as:

Hutchins, K., Harris, A., Thomas, J., Alkhairy, S., Vercellin, A. C. V., Shah, A., & Siesky, B. (2018). Alzheimer's disease and primary open-angle glaucoma associated with vascular health in patients of African descent. *Acta Ophthalmologica*, 96(8), e1031–e1031. <https://doi.org/10.1111/aos.13739>

on the disease (Nucci et al. 2015). It has been suggested that POAG patients of African descent have a stronger vascular component in their disease process, including local and systemic vascular and metabolism biomarkers. Recently, a four-year prospective study identified reduced blood flow in the retrobulbar and retinal vasculature as predictors of glaucomatous structural progression in both the optic nerve head and macula, at significantly higher levels in persons of African compared to European descent (Siesky et al. 2016). Specific vascular changes have also been identified in AD including capillary dysfunction and regional capillary loss, both associated with cognitive deterioration (Nielsen et al. 2017). In addition, recent data suggest patients with AD may have changes in retinal oxygen metabolism (Stefánsson et al. 2017) as retinal oxygen saturation in arterioles and venules was shown to be significantly elevated in patients with moderate AD compared to healthy individuals (Einarsdottir et al. 2016).

Together these findings suggest that vascular insult may be implicated as a shared mechanistic pathway that accounts for the disease disparity seen in both AD and POAG in persons of African descent. The recent advancement of ocular imaging modalities that allow for the examination of the microvasculature of the optic nerve, specifically ocular coherence tomography angiography (OCTA), may provide a useful and noninvasive biomarker differential in not only glaucoma, but also AD, particularly in patients of African descent. We, herein, encourage more research to identify these shared vascular pathways in AD and POAG so we may improve outcomes for persons of African descent experiencing these disease disparities.

Acknowledgments and Disclosures

Supported by a grant from Research to Prevent Blindness, Inc. (New York, NY.). The funding party did not have any role in the collection of data, analysis of data, writing the manuscript or decision to submit the manuscript.

There is no conflict of interests. Dr. Alon Harris would like to disclose that he receives remuneration from CIPLA Shire, and AdOM for serving as a consultant. Dr. Harris also holds an ownership interest in AdOM, Nano Retina and Oxymap. All relationships listed above are pursuant to Indiana University's policy on outside activities.

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